



ttorney Docket No. IMMR-084/04US

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of Louis B. ROSENBERG

Serial No.:

10/687,830

Examiner:

Unassigned

Confirmation No.: 2880

Art Unit:

2635

Filed:

October 20, 2003

For:

ISOTONIC-ISOMETRIC HAPTIC FEEDBACK INTERFACE

U.S. Patent and Trademark Office 220 20th Street South Customer Window Crystal Plaza Two, Lobby, Room 1B03 Arlington, VA 22202

TRANSMITTAL OF DOCUMENTS

Enclosed are the following documents for the above-identified application:

$[\mathbf{x}]$	Information	Disclosure	Statement	Transmittal
Λ	minormanon	Disciosure	Statement	1 i ai i Si i i i i i ai

- Information Disclosure Statement [x]
- PTO/SB/08 (1 of 2) with copies of 112 cited references provided on CD [x]
- PTO/SB/08 (2 of 2) [x]
- Return receipt postcard [x]
- Check No. ___ in the amount of \$ for the total fee as calculated below []
- П Other:

The fee has been calculated as follows:

	NO. OF CLAIMS		EXTRA CLAIMS	RATE	FEE
Total Claims	30	- 30 =		x \$18.00	
Independent Claims	6	- 6 =		x \$88.00	
If multiple depo	ndependent 6 - 6 = x \$88.00 Claims f multiple dependent claims are presented, add \$300.00 Total Amendment Fee f small entity status is applicable, subtract 50% of Total Amendment Fee				
Total Amendm	If multiple dependent claims are presented, add \$300.00 Total Amendment Fee				
If small entity s					
Other fees: (spe	CLAIMS tal Claims 30 - 30 = x \$18.00 dependent aims multiple dependent claims are presented, add \$300.00 tal Amendment Fee small entity status is applicable, subtract 50% of Total Amendment Fee her fees: (specify)				
TOTAL FEE	Total Claims 30 $-30 =$ x \$18.00 Independent 6 $-6 =$ x \$88.00				

- [] A check for the total fee is attached.
- [] Please charge \$ to Deposit Account No. 50-1283 for the total fee. This paper is being submitted in duplicate.

The Commissioner is hereby authorized to charge any appropriate fees under 37 C.F.R. §§1.16, 1.17, and 1.21 that may be required by this paper, and to credit any overpayment, to Deposit Account No. 50-1283.

Dated: November 16, 2004

Cooley Godward LLP ATTN: Patent Group One Freedom Square Reston Town Center 11951 Freedom Drive Reston, VA 20190-5656

Tel: (703) 456-8000 Fax: (703) 456-8100 Respectfully submitted, COOLEY GODWARD LLP

By:

Erik B. Milch Reg. No. 42,887

224226 v1/RE 4t0\$01!.DOC

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of Louis B. ROSENBERG

Serial No.:

10/687,830

Examiner:

Unassigned

Confirmation No.: 2880

Art Unit:

2635

Filed:

October 20, 2003

For:

ISOTONIC-ISOMETRIC HAPTIC FEEDBACK INTERFACE

U.S. Patent and Trademark Office 220 20th Street South **Customer Window** Crystal Plaza Two, Lobby, Room 1B03 Arlington, VA 22202

INFORMATION DISCLOSURE STATEMENT TRANSMITTAL

Enclosed is an Information Disclosure Statement and accompanying Form PTO/SB/08A for the above-identified patent application.

[x]	In accordance with 37 C.F.R. §1.97(b), no additional fee for submission of the IDS is required.
[]	In accordance with 37 C.F.R. §1.97(c), also enclosed is:
	[] the fee of \$180.00 as set forth in 37 C.F.R. §1.17(p); or
	[] a statement as specified in 37 C.F.R. §1.97(e).
[]	In accordance with 37 C.F.R. §1.97(d), a statement as specified in 37 C.F.R. § 1.97(e) and the fee of \$180.00 as set forth in 37 C.F.R. §1.17(p) are also enclosed.
[]	Check No in the amount of \$ for the total fee is attached.
[]	A return receipt postcard is also enclosed.
[]	Please charge \$ to Deposit Account No. 50-1283 for the total fee. This paper is being submitted in duplicate.

The Commissioner is hereby authorized to charge any appropriate fees under 37 C.F.R. §§1.16, 1.17, and 1.21 that may be required by this paper, and to credit any overpayment, to Deposit Account No. 50-1283.

Dated: November 16, 2004

Cooley Godward LLP ATTN: Patent Group One Freedom Square Reston Town Center 11951 Freedom Drive Reston, VA 20190-5656

Tel: (703) 456-8000 Fax: (703) 456-8100

224220 v1/RE 4t0c01!.DOC Respectfully submitted, COOLEY GODWARD LLP

By:

Erik B. Milch Reg. No. 42,887

N THE UNITED STATES PATENT AND TRADEMARK OFFICE

if re application of Louis B. ROSENBERG

Serial No.:

10/687,830

Examiner:

Unassigned

Confirmation No.: 2880

Art Unit:

2635

Filed:

October 20, 2003

For:

ISOTONIC-ISOMETRIC HAPTIC FEEDBACK INTERFACE

U.S. Patent and Trademark Office 220 20th Street South Customer Window Crystal Plaza Two, Lobby, Room 1B03 Arlington, VA 22202

INFORMATION DISCLOSURE STATEMENT UNDER 37 C.F.R. §1.97(b)

In accordance with the duty of disclosure set forth in 37 C.F.R. §1.56, Applicant(s) hereby submits the following information in conformance with 37 C.F.R. §§1.97 and 1.98.

- Pursuant to 37 C.F.R. §1.98, a copy of each document cited in the attached [x]PTO/SB/08 (1 of 2) is provided on the enclosed CD.
- No copies of the publications listed on the attached Form PTO/SB/08A (2) [x]of 2) are being provided pursuant to 37 C.F.R. §1.98(d) because the publications were previously cited by or submitted to the Office in prior Application Serial Nos. <u>U.S. Patent Appln. No. 09/903,209 (now U.S.</u> Patent No. 6,636,161); U.S. Patent Appln. No. 09/499,338 (now U.S. Patent No. 6,259,382); U.S. Patent Appln. No. 09/160,985 (now U.S. Patent No. 6,232,891); and/or U.S. Patent Appln. No. 08/756,745 (now U.S. Patent No. 5,825,308) to which the above-identified application claims priority under 35 U.S.C. §120.
- No copies of any U.S. patents or U.S. patent application publications listed on the attached Form PTO/SB/08A are being provided pursuant to 37 C.F.R. §1.98 because this application was filed after June 30, 2003.

Attorney Docket No. IMMR-084/04US Serial No. 10/687,830 Page 2

IJ	foreig	cation(s) listed on the attached Form PTO/SB/08A were cited in a gn search or examination report corresponding to application no and mailed on
[]	of the	sed is a copy of a non-English publication(s) Pursuant to §609 m.P.E.P., Applicant submits the attached foreign search or ination report, which cites such non-English language publication(s).
[]	publi	osed is a copy of a non-English publication(s) English language cation (copy enclosed) claims priority from this non-English cation.
[]		sed is an explanation of non-English publication(s) for which an sh translation is not available.
[]		sed is an English translation of non-English publication(s)cited attached Form PTO/SB/08A.
[]	Enclo	sed is a copy of pending patent Application Serial No
Thi		tion Disclosure Statement is filed within any one of the following
	[]	within three months from the filing date of this national application other than a CPA under 37 C.F.R. § 1.53(d);
		within three months from the date of entry of the national stage as set forth in 37 C.F.R. §1.491 in this international application;
	[x]	before the mailing date of a first office action on the merits; or
	[]	before the mailing of a first office action after the filing of a request for continued examination under 37 C.F.R. § 1.114.

It is respectfully requested that the Examiner consider the above-noted information and return an initialed copy of the attached Form PTO/SB/08A to the undersigned.

Dated: November 16, 2004

Respectfully submitted, COOLEY GODWARD LLP

Cooley Godward LLP ATTN: Patent Group One Freedom Square Reston Town Center 11951 Freedom Drive Reston, VA 20190-5656

Tel: (703) 456-8000 Fax: (703) 456-8100 By:

Erik B. Milch Reg. No. 42,887

224212 v1/RE 4t0401!.DOC (1 of 2)

1

of | 6

Sheet

PTO/SB/08A (10-01)

Approved for use through 10/31/2002. OMB 0651-0031=U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

IMMR-084/04US

Inder the Pagerwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Attorney Docket Number

Substitute 1449A/PTO Application Number 10/687,830 Filing Date October 20, 2003 First Named Inventor Louis B. Rosenberg Art Unit 2635 (use as many sheets as necessary) Examiner Name Unassigned

	U.S. PATENT DOCUMENTS					
Examiner	Cite No.1	Document Number Number Kind Code ² (<i>if known</i>)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	
		6,422,941	7/23/2002	Thorner et al.		
		6,160,489	12/12/2000	Perry et al.		
		6,111,577	8/29/2000	Zilles et al.		
		5,785,630	7/28/1998	Bobick et al.		
		5,766,016	6/16/1998	Sinclair		
		5,690,582	11/25/1997	Ulrich et al.		
		5,575,761	11/19/1996	Hajianpour		
		5,547,382	8/20/1996	Yamasaki		
		5,466,213	11/14/1995	Hogan		
		5,437,607	8/1/1995	Taylor		
		5,436,622	7/25/1995	Gutman et al.		
		5,334,027	8/2/1994	Wherlock		
		5,309,140	5/3/1994	Everett		
		5,299,810	4/5/1994	Pierce		
		5,283,970	2/8/1994	Aigner		
		5,275,174	1/4/1994	Cook		
		5,271,290	12/21/1993	Fischer		
		5,240,417	8/31/1993	Smithson et al.		
		5,212,473	5/18/1993	Louis		
		5,186,695	2/16/1993	Mangseth et al.		
		5,175,459	12/29/1992	Danial et al.		
		5,165,897	11/24/1992	Johnson		
		5,078,152	1/7/1992	Bond		
		5,038,089	8/6/1991	Szakaly	-	
		5,035,242	7/30/1991	Franklin		
		5,022,407	6/11/1991	Horch et al.		
		5,022,384	6/11/1991	Freels		
		5,019,761	5/28/1991	Kraft		
		4,934,694	6/19/1990	McIntosh		
		4,930,770	6/5/1990	Baker		
		4,891,764	1/2/1990	McIntosh		
		4,885,565	12/5/1989	Embach		
		4,794,392	12/27/1988	Selinko		
		4,713,007	12/15/1987	Alban		
		4,708,656	11/24/1987	De Vries et al.		

Examiner Signature	Date Considered	

EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

¹ Applicant's unique citation designation number (optional). ² Kind Codes of U.S. Patent Documents at www.uspto.gov or MPEP 901.04. ³ Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). ⁴ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁵ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible. ⁶ Applicant is to place a check mark here if English language Translation is attached.

Approved for use through 10/31/2002. OMB 0651-0031 U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449A/PTO		Complete if Known
	Application Number	10/687,830
INFORMATION DISCLOSURE	Filing Date	October 20, 2003
STATEMENT BY APPLICANT	First Named Inventor	Louis B. Rosenberg
	Art Unit	2635
(use as many sheets as necessary)	Examiner Name	Unassigned
Sheet 2 of 6	Attorney Docket Number	IMMR-084/04US

			U.S. PATENT DOC	UMENTS	
Examiner	Cite No.1	Document Number Number Kind Code ² (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		4,599,070	7/8/1986	Hladky et al.	
		4,581,491	4/8/1986	Boothroyd	
		4,513,235	4/23/1985	Acklam et al.	
		4,484,191	11/20/1984	Vavra	
		4,464,117	8/7/1984	Foerst	
		4,333,070	6/1/1982	Barnes	
		4,262,549	4/21/1981	Schwellenbach	
		4,236,325	10/2/1980	Hall et al.	
		4,160,508	7/10/1979	Salsbury	
		4,127,752	11/28/1978	Lowthorp	
		3,911,416	10/7/1995	Feder	
		3,903,614	9/9/1975	Diamond et al	
		3,902,687	6/25/1973	Hightower	_
		3,623,064	11/23/1970	Kagan	
		3,517,446	6/30/1970	Corlyon et al.	
		3,497,668	2/24/1970	Hirsch	
		3,220,121	11/30/1965	Cutler	
		3,157,853	11/17/1964	Hirsch	
		2,972,140	2/14/1961	Hirsch	

	Cita	Foreign Patent Document			Name of Patentee or	Pages, Columns, Lines,	
		Cite No. ¹	Country Code ³	Number ⁴	Kind Code ⁵ (if known)	Publication Date MM-DD-YYYY	Applicant of Cited Document
		EP	0349086		1/3/1990	Stork Kwant B.V.	
	•	JP	H2-185278		7/19/1990	Taito Corporation	
		JP	H4-8381		1/13/1992	Epoch Co. and Key- Planning Co.	
•		JP	H7-24147		1/27/1995	Sega Corporation	
		JP	H5-192449		8/3/1993	Taito Corporation	
	Ì						

Examiner Signature	Date Considered	

EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

¹ Applicant's unique citation designation number (optional). ² Kind Codes of U.S. Patent Documents at www.uspto.gov or MPEP 901.04. ³ Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). ⁴ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁵ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible. ⁶ Applicant is to place a check mark here if English language Translation is attached.

Substitute for form 1449B/PTO	Complete if Known			
INFORMATION DIOOL COURS	Application Number	10/687,830		
INFORMATION DISCLOSURE	Filing Date	October 20, 2003		
STATEMENT BY APPLICANT	First Named Inventor	Louis B. Rosenberg		
	Art Unit	2635		
(use as many sheets as necessary)	Examiner Name	Unassigned		
Sheet 3 of 6	Attorney Docket Number	IMMR-084/04US		

		OTHER PRIOR ART NON PATENT LITERATURE DOCUMENTS	
Examiner Initials *	Cite No.1	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	
		BAIGRIE, "Electric Control Loading - A Low Cost, High Performance Alternative," Proceedings of Interservice/Industry Training Systems Conference, pp. 247-254, November 6-8, 1990.	
		IWATA, "Pen-based Haptic Virtual Environment," 0-7803-1363-1/93 IEEE, pp 287-292, 1993.	
		RUSSO, "The Design and Implementation of a Three Degree of Freedom Force Output Joystick," MtT Libraries Archives, pp. 1-131, May 1990, archived 08/14/1990.	
		BROOKS et al., "Hand Controllers for Teleoperation - A State-of-the-Art Technology Survey and Evaluation," JPL Publication 85-11; NASA-CR-175890; N85-28559, pp. 1-84, 03/1/1985.	
		JONES et al., "A perceptual analysis of stiffness," ISSN 0014-4819 Springer International (Springer-Verlag); Experimental Brain Research, Vol. 79, No. 1, pp. 150-156, 1990.	
		BURDEA et al., "Distributed Virtual Force Feedback, Lecture Notes for Workshop on Force Display in Virtual Environments and its Application to Robotic Teleoperation," 1993 IEEE International Conference on Robotics and Automation, pp. 25-44, 05/02/1993.	
		SNOW et al., "Model-X Force-Reflecting-Hand-Controller," NT Control No. NPO-17851; JPL Case No. 7348, pp. 1-4, with 45 pages of attachments, 06/15/1989.	
		OUH-YOUNG, "Force Display in Molecular Docking," Doctoral Dissertation, University of North Carolina at Chapel Hill, UMI Order No. 9034744, pp. 1-369, 1990.	
		TADROS, "Control System Design for a Three Degree of Freedom Virtual Environment Simulator Using Motor/Brake Pair Actuators, MIT Archive, pp. 1-88, February 1990, archived 8/13/90.	
		CALDWELL et al., "Enhanced Tactile Feedback (Tele-Taction) Using a Multi-Functional Sensory System," 1050-4729/93, pp. 955-960, 1993.	
		ADELSTEIN, "Design and Implementation of a Force Reflecting Manipulandum for Manual Control research," DSC-Vol. 42, Advances in Robotics, pp. 1-12, 1992.	
		GOTOW et al., "Controlled Impedance Test Apparatus for Studying Human Interpretation of Kinesthetic Feedback," WA11-11:00, pp. 332-337.	
		STANLEY et al., "Computer Simulation of Interacting Dynamic Mechanical Systems Using Distributed Memory Parallel Processors," DSC-Vol. 42, Advances in Robotics, pp. 55-61, ASME 1992.	_
		RUSSO, "Controlling Dissipative Magnetic Particle Brakes in Force Reflective Devices," DSC-Vol. 42, Advances in Robotics, pp. 63-70, ASME 1992.	

Examiner	Date	
Signature	Considered	

EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.



¹ Applicant's unique citation designation number (optional). 2 Applicant is to place a check mark here if English language Translation is attached.

	Substitute t	for form 1449	B/PTO			Complete if Known		
	NICOI		0N D		OCUPE	Application Number	10/687,830	
INFORMATION DISCLOSURE						Filing Date	October 20, 2003	
	STAT	EMEN	TBY	APP	LICANT	First Named Inventor	Louis B. Rosenberg	
						Art Unit	2635	
	('use as mai	ny sheets	as ned	essary)	Examiner Name	Unassigned	
乀	Sheet	4	0	f 6		Attorney Docket Number	IMMR-084/04US	

		OTHER PRIOR ART NON PATENT LITERATURE DOCUMENTS	
Examiner Initials *	Cite No.1	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	
		KONTARINIS et al., "Display of High-Frequency Tactile Information to Teleoperators," <i>Telemanipulator Technology and Space Telerobotics</i> , Won S. Kim, Editor, Proc. SPIE Vol. 2057, pp. 40-50, Sep. 7-9, 1993.	
· · · · · · · ·		PATRICK et al., "Design and Testing of A Non-reactive, Fingertip, Tactile Display for Interaction with Remote Environments," Cooperative Intelligent Robotics in Space, Rui J. deFigueiredo et al., Editor, Proc. SPIE Vol. 1387, pp. 215-222, 1990.	
		ADELSTEIN, "A Virtual Environment System For The Study of Human Arm Tremor," <i>Ph.D. Dissertation</i> , Dept. of Mechanical Engineering, MIT, June 1989, archived 3/13/90.	
		BEJCZY, "Sensors, Controls, and Man-Machine Interface for Advanced Teleoperation," Science, Vol. 208, No. 4450, pp. 1327-1335, 1980.	
		BEJCZY et al., "Generalization of Bilateral Force-Reflecting Control of Manipulators," <i>Proceedings Of Fourth CISM-IFTOMM</i> , Sep. 8-12, 1981.	
		MCAFFEE, "Teleoperator Subsystem/Telerobot Demonsdtrator: Force Reflecting Hand Controller Equipment Manual," JPL D-5172, January 1988.	
		MINSKY, "Computational Haptics: The Sandpaper System for Synthesizing Texture for a Force-Feedback Display," Ph.D. Dissertation, MIT, June 1995, archived 7/6/95.	
		JACOBSEN et al., "High Performance, Dextrous Telerobotic Manipulator With Force Reflection," Intervention/ROV '91 Conference & Exposition, Hollywood, Florida, May 21-23, 1991.	
		SHIMOGA, "Finger Force and Touch Feedback Issues in Dexterous Telemanipulation," <i>Proceedings of Fourth Annual Conference on Intelligent Robotic Systems for Space Exploration</i> , Rensselaer Polytechnic Institute, Sep. 30 - Oct. 1, 1992.	
		IBM Technical Disclosure Bulletin, "Mouse Ball-Actuating Device With Force and Tactile Feedback," Vol. 32, No. 9B, February 1990.	
		TERRY et al., "Tactile Feedback In A Computer Mouse," Proceedings of Fouteenth Annual Northeast Bioengineering Conference, University of New Hampshire, March 10-11, 1988.	
		HOWE, "A Force-Reflecting Teleoperated Hand System for the Study of Tactile Sensing in Precision Manipulation," Proceedings of the 1992 IEEE International Conference on Robotics and Automation, Nice, France, May 1992.	
		EBERHARDT et al., "OMAR - A Haptic display for speech perception by deaf and deaf-blind individuals," <i>IEEE Virtual Reality Annual International Symposium</i> , Seattle, WA, Sep. 18-22, 1993.	
		RABINOWITZ et al., "Multidimensional tactile displays: Identification of vibratory intensity, frequency, and contactor area," Journal of The Acoustical Society of America, Vol. 82, No. 4, October 1987.	

Examiner	Date	· ·
Signature		
Signature	Considered	

EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

¹ Applicant's unique citation designation number (optional). 2 Applicant is to place a check mark here if English language Translation is attached.

Sub	stitute for form 1449	B/PTO		Complete if Known			
INI		ON DIC	CLOCUDE	Application Number	10/687,830		
			CLOSURE	Filing Date	October 20, 2003		
SI	ATEMEN	T BY A	PPLICANT	First Named Inventor	Louis B. Rosenberg		
				Art Unit	2635		
	(use as mar	ny sheets as	necessary)	Examiner Name	Unassigned	\exists	
She	et 5	of	6	Attorney Docket Number	IMMR-084/04US	フ	

		OTHER PRIOR ART NON PATENT LITERATURE DOCUMENTS	
Examiner Initials *	Cite No.1	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	
		BEJCZY et al., "Kinesthetic Coupling Between Operator and Remote Manipulator," International Computer Technology Conference, The American Society of Mechanical Engineers, San Francisco, CA, August 12-15, 1980.	
		BEJCZY et al., "A Laboratory Breadboard System For Dual-Arm Teleoperation," SOAR '89 Workshop, JSC, Houston, TX, July 25-27, 1989.	
		OUH-YOUNG, "A Low-Cost Force Feedback Joystick and Its Use in PC Video Games," <i>IEEE Transactions on Consumer Electronics</i> , Vol. 41, No. 3, August 1995.	_
		MARCUS, "Touch Feedback in Surgery," Proceedings of Virtual Reality and Medicine The Cutting Edge, Sept. 8-11, 1994.	_
		BEJCZY, et al., "Universal Computer Control System (UCCS) For Space Telerobots," CH2413-3/87/0000/0318501.00 1987 IEEE, 1987.	_
		PATRICK, "Design, Construction, and Testing of a Fingertip Tactile Display for Interaction with Virtual and Remote Environments," <i>Master of Science Thesis</i> , MIT, Aug. 1990, archived Nov. 8, 1990.	
-		CALDER, "Design of A Force-Feedback Touch-Introducing Actuator For Teleoperator Robot Control," Bachelor of Science Thesis, MIT, May 1983, archived June 23, 1983.	_
		WIKER, "Teletouch Display Development: Phase 1 Report," <i>Technical Report 1230</i> , Naval Ocean Systems Center, San Diego, July 1988.	_
		BLISS, "Optical-to-Tactile Image Conversion for the Blind," <i>IEEE Transactions on Man-Machine Systems</i> , Vol. MMS-11, No. 1, March 1970.	-
		JOHNSON, "Shape-Memory Alloy Tactile Feedback Actuator," Armstrong Aerospace Medical Research Laboratory, AAMRL-TR-90-039, August, 1990.	
		KONTARINIS et al., "Tactile Display of Vibratory Information in Teleoperation and Virtual Environments," PRESENCE, 4(4):387-402, Harvard Univ., 1995.	_
_		AUKSTAKALNIS et al., "Silicon Mirage: The Art and Science of Virtual Reality," ISBN 0-938151-82-7, pp. 129-180, 1992.	_
		EBERHARDT et al., "Inducing Dynamic Haptic Perception by The Hand: System Description and Some Results," DSC-Vol. 55-1, Dynamic Systems and Control: Volume 1, ASME 1994.	
		GOBEL et al., "Tactile Feedback Applied to Computer Mice," <i>International Journal of Human-Computer Interaction</i> , Vol. 7, No. 1, pp. 1-24, 1995.	_

Examiner	Date	
Signature	Considered	

EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.



¹ Applicant's unique citation designation number (optional). 2 Applicant is to place a check mark here if English language Translation is attached.

Substitut	e for form 1449B/PTO)		Complete if Known		
INITO	DMATION	DIO	OL COURT	Application Number	10/687,830	
	RMATION			Filing Date	October 20, 2003	
STA	TEMENT B	ΥA	PPLICANT	First Named Inventor	Louis B. Rosenberg	
				Art Unit	2635	
	(use as many sheets as necessary)			Examiner Name	Unassigned	
Sheet	6	of	6	Attorney Docket Number	IMMR-084/04US	

		OTHER PRIOR ART NON PATENT LITERATURE DOCUMENTS	
Examiner Initials *	Cite No.1	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	
		PIMENTEL et al., "Virtual Reality: through the new looking glass," 2 nd Edition; McGraw-Hill, ISBN 0-07-050167-X, pp. 41-202, 1994.	
·		*Cyberman Technical Specification," Logitech Cyberman SWIFT Supplement to Logitech Mouse Technical Reference and Programming Guide, 4/5/1994.	
		OUHYOUNG et al., "The Development of A Low-Cost Force Feedback Joystick and Its Use in the Virtual Reality Environment," Proceedings of the Third Pacific Conference on Computer Graphics and Applications, Pacific Graphics '95, Seoul, Korea, 21-24 August 1995.	
		KACZMAREK et al., "Tactile Displays," Virtual Environment Technologies, Chap. 9, pp. 349-414.	
		LAKE, "Cyberman from Logitech," at http://www.ibiblio.org/GameBytes/issue21/greviews/cyberman.html, 1994.	
		"Component Maintenance Manual With Illustrated Parts List, Coaxial Control Shaker Part No. C-25502," Safe Flight Instrument Corporation, Revised 28 January 2002 (3 pages).	
		"Technical Manual Overhaul Instructions With Parts Breakdown, Coaxial Control Shaker Part No. C-25502," Safe Flight Instrument Corporation, Revised 15 July 1980 (23 pages).	
		SCANNELL, "Taking a Joystick Ride," Computer Currents, Boston Edition, Vol. 9, No. 11, November 1994	
		YAMAKITA et al., "Tele-Virtual Reality of Dynamic Mechanical Model," <i>Proceedings of the 1992 IEEE/RSJ International Conference on Intelligent Robots and Systems</i> , Raleigh, NC, July 7-10, 1992	
		NOLL, "Man-Machine Tactile," SID Journal, July/August 1972 Issue.	
		ROSENBERG, "Virtual Fixtures: Perceptual Overlays Enhance Operator Performance In Telepresence Tasks," <i>Ph.D. Dissertation</i> , Stanford University, June 1994.	

Examiner	Date	
Signature	Considered	

EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.



¹ Applicant's unique citation designation number (optional). 2 Applicant is to place a check mark here if English language Translation is attached.

Approved for use through 10/31/2002. OMB 0651-0031 U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449A/PTO	Complete if Known		
	Application Number	10/687,830	
INFORMATION DISCLOSURE	Filing Date	October 20, 2003	
STATEMENT BY APPLICANT	First Named Inventor	Louis B. Rosenberg	
	Art Unit	2635	
(use as many sheets as necessary)	Examiner Name	Unassigned	
Sheet 1 of 11	Attorney Docket Number	IMMR-084/04US	

			U.S. PATENT DOC	<u>JMENTS</u>	
		Document Number			
Examiner	Cite No.1	Number Kind Code ² (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		3,157,853	11-1964	Hirsch	
		3,220,121	11-1965	Cutler	
		3,497,668	02-1970	Hirsch	
		3,517,446	06-1970	Corlyon et al.	
		3,623,064	11-1971	Kagan	
		3,902,687	09-1975	Hightower	
		3,903,614	09-1975	Diamond et al.	
		3,911,416	10-1975	Feder	
		3,919,691	11-1975	Noli	
		3,944,798	03-1976	Eaton	
		4,125,800	11-1978	Jones	
		4,148,014	04-1979	Burson	
		4,160,508	07-1979	Frosch et al.	
		4,236,325	12-1980	Hall et al.	
		4,477,043	10-1984	Repperger	
		4,513,235	04-1985	Acklam et al.	
		4,581,491	04-1986	Boothroyd	
		4,599,070	07-1986	Hladky et al.	
		4,654,648	03-1987	Herrington et al.	
		4,708,656	11-1987	De Vries et al.	
	_	4,713,007	12-1987	Alban	
		4,724,715	02-1988	Culver	
		4,734,685	03-1988	Watanabe	
		4,775,289	10-1988	Kazerooni	- 1A
		4,787,051	11-1988	Olson	
		4,794,392	12-1988	Selinko	
		4,798,919	01-1989	Miessler et al.	
		4,800,721	01-1989	Cemenska et al.	
		4,811,608	03-1989	Hilton	
		4,823,634	04-1989	Culver	
		4,839,838	06-1989	LaBiche et al.	
		4,868,549	09-1989	Affinito et al.	
		4,879,556	11-1989	Duimel	
		4,891,764	01-1990	McIntosh	
		4,930,770	06-1990	Baker	

Examiner Signature	Date Considered	

EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

¹ Applicant's unique citation designation number (optional). ² Kind Codes of U.S. Patent Documents at www.uspto.gov or MPEP 901.04. ³ Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). ⁴ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁵ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible. ⁶ Applicant is to place a check mark here if English language Translation is attached.

Approved for use through 10/31/2002. OMB 0651-0031=
U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449A/PTO	Complete if Known		
	Application Number	10/687,830	
INFORMATION DISCLOSURE	Filing Date	October 20, 2003	
STATEMENT BY APPLICANT	First Named Inventor	Louis B. Rosenberg	
	Art Unit	2635	
(use as many sheets as necessary)	Examiner Name	Unassigned	
Sheet 2 of 11	Attorney Docket Number	IMMR-084/04US	

		Document Number			
Examiner	Cite No.1	Number Kind Code ² (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		4,934,694	06-1990	McIntosh	
		4,935,728	06-1990	Kley	
		4,949,119	08-1990	Moncrief et al.	
		4,961,138	10-1990	Gorniak	
		4,961,267	10-1990	Herzog	
		4,983,786	01-1991	Stevens et al.	
		5,007,300	04-1991	Siva	
		5,019,761	05-1991	Kraft	
		5,022,407	06-1991	Horch et al.	
		5,035,242	07-1991	Franklin et al.	
		5,038,089	08-1991	Szakaly	
		5,044,956	09-1991	Behensky et al.	
		5,065,145_	11-1991	Purcell	
		5,078,152	01-1992	Bond et al.	
		5,095,303	03-1992	Clark et al.	
		5,103,404	04-1992	McIntosh	
		5,107,080	04-1992	Rosen	
		5,107,262	04-1992	Cadoz et al.	
		5,113,179	05-1992	Scott-Jackson et al.	
		5,116,051	05-1992	Monocrief et al.	
		5,139,261	08-1992	Openiano	
		5,143,505	09-1992	Burdea et al.	
		5,146,566	09-1992	Hollis, Jr. et al.	
		5,181,181	01-1993	Glynn	
		5,184,319	02-1993	Kramer	
		5,185,561	02-1993	Good et al.	•
		5,186,629	02-1993	Rohen	
		5,193,963	03-1993	McAffee	
		5,212,473	05-1993	Louis	
		5,220,260	06-1993	Schuler	
		5,223,776	06-1993	Radke et al.	
		5,228,356	07-1993	Chuang	
		5,235,868	08-1993	Culver	
		5,240,417	08-1993	Frosch et al.	
		5,271,290	12-1993	Fischer	

_		
	Examiner Signature	Date Considered

EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

¹ Applicant's unique citation designation number (optional). ² Kind Codes of U.S. Patent Documents at www.uspto.gov or MPEP 901.04. ³ Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). 4 For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. 5 Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible. ⁶ Applicant is to place a check mark here if English language Translation is attached.

Approved for use through 10/31/2002. OMB 0651-0031**
U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

Substitute for form 1449A/PTO	Complete if Known		
	Application Number	10/687,830	
INFORMATION DISCLOSURE	Filing Date	October 20, 2003	
STATEMENT BY APPLICANT	First Named Inventor	Louis B. Rosenberg	
	Art Unit	2635	
(use as many sheets as necessary)	Examiner Name	Unassigned	
Sheet 3 of 11	Attorney Docket Number	IMMR-084/04US	

			U.S. PATENT DOC	UMENTS	
Examiner	Cite No.1	Document Number Number Kind Code ² (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		5,275,174	01-1994	Cook	
		5,280,276	01-1994	Kwok	W-0-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-
		5,290,276	03-1994	Kwok	
		5,296,846	03-1994	Ledley	
		5,296,871	03-1994	Paley	
		5,298,890	03-1994	Kanamaru et al.	
		5,299,810	04-1994	Pierce et al.	
		5,309,140	05-1994	Everett, Jr. et al.	
		5,334,027	08-1994	Wherlock	
		5,355,148	10-1994	Anderson	
		5,374,942	12-1994	Gilligan et al.	
		5,389,865	02-1995	Jacobus et al.	
		5,396,266	03-1995	Brimhall	
		5,397,323	03-1995	Taylor et al.	
		5,398,044	03-1995	Hill	
		5,405,152	04-1995	Katanics et al.	
		5,414,337	05-1995	Schuler	
		5,429,140	07-1995	Burdea et al.	
	•	5,436,638	07-1995	Bolas et al.	
		5,436,640	07-1995	Reeves	
		5,438,529	08-1995	Rosenburg	
	***	5,451,924	09-1995	Massimino et al.	
		5,457,479	10-1995	Cheng	
		5,466,213	11-1995	Hogan et al.	
		5,471,571	11-1995	Smith et al.	
_		5,479,192	12-1995	Carroll	
		5,491,477	02-1996	Clark et al.	
		5,512,919	04-1996	Araki	
_		5,513,100	04-1996	Parker et al.	
		5,530,455	06-1996	Gillick	
		5,547,382	08-1996	Yamasaki et al.	
		5,565,887	10-1996	McCambridge et al.	
		5,570,111	10-1996	Barrett et al.	
		5,576,727	11-1996	Rosenberg et al.	
		5,587,937	12-1996	Massie et al.	

Examiner Signature	Date Considered	

EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

¹ Applicant's unique citation designation number (optional). ² Kind Codes of U.S. Patent Documents at www.uspto.gov or MPEP 901.04. ³ Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). ⁴ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁵ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible. ⁶ Applicant is to place a check mark here if English language Translation is attached.

Burden Hour Statement: This form is estimated to take 2.0 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231

Approved for use through 10/31/2002. OMB 0651-0031= U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

Substitute for form 1449A/PTO		Complete if Known
	Application Number	10/687,830
INFORMATION DISCLOSURE	Filing Date	October 20, 2003
STATEMENT BY APPLICANT	First Named Inventor	Louis B. Rosenberg
	Art Unit	2635
(use as many sheets as necessary)	Examiner Name	Unassigned
Sheet 4 of 11	Attorney Docket Number	IMMR-084/04US

			U.S. PATENT DOC	DIAIEMIS	
Examiner	Cite No.1	Document Number Number Kind Code ² (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		5,589,828	12-1996	Armstrong	
		5,589,854	12-1996	Tsai	
		5,591,924	01-1997	Hilton	
		5,596,347	01-1997	Robertson et al.	
		5,623,582	04-1997	Rosenberg	
		5,623,642	04-1997	Katz et al.	
		5,629,594	05-1997	Jacobus et al.	
		5,634,794	06-1997	Hildreth et al.	
		5,642,469	06-1997	Hannaford et al.	
	·	5,643,087	07-1997	Marcus et al.	
		5,666,138	09-1997	Culver	
		5,666,473	09-1997	Wallace	
		5,691,747	11-1997	Amano	
		5,691,898	11-1997	Rosenberg	
		5,696,537	12-1997	Solhjell	
		5,709,219	01-1998	Chen et al.	
		5,714,978	02-1998	Yamanaka et al.	
		5,721,566	02-1998	Rosenberg et al.	
		5,734,373	03-1998	Rosenberg et al.	
		5,736,978	04-1998	Hasser et al.	
		5,742,278	04-1998	Chen et al.	
		5,745,715	04-1998	Pickover et al.	
		5,754,023	05-1998	Roston et al.	
		5,757,358	05-1998	Osga	
		5,766,016	06-1998	Sinclair et al.	771-15
		5,767,839	06-1998	Rosenberg	
		5,781,172	07-1998	Engel et al.	
		5,784,052	07-1998	Keyson	
		5,785,630	07-1998	Bobick et al.	
		5,790,108	08-1998	Salcudean et al.	
		5,802,353	09-1998	Avila et al.	
		5,805,140	09-1998	Rosenberg et al.	
		5,805,165	09-1998	Thorne, III et al.	
		5,808,601	09-1998	Leah et al.	-
	-	5,841,423	11-1998	Carroll	•

	 		_
Examiner Signature	Date Considered		brack

EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

¹ Applicant's unique citation designation number (optional). ² Kind Codes of U.S. Patent Documents at www.uspto.gov or MPEP 901.04. ³ Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). ⁴ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁵ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible. ⁶ Applicant is to place a check mark here if English language Translation is attached.

Burden Hour Statement: This form is estimated to take 2.0 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231

Approved for use through 10/31/2002. OMB 0651-0031= U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449A/PTO	Complete if Known		
	Application Number	10/687,830	
INFORMATION DISCLOSURE	Filing Date	October 20, 2003	
STATEMENT BY APPLICANT	First Named Inventor	Louis B. Rosenberg	
	Art Unit	2635	
(use as many sheets as necessary)	Examiner Name	Unassigned	
Sheet 5 of 11	Attorney Docket Number	IMMR-084/04US	

	U.S. PATENT DOCUMENTS						
	Document Number						
Examiner	Cite No.1	Number Kind Code ² (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear		
		5,844,392	12-1998	Peurach et al.			
		5,889,670	03-1999	Schuler et al.			
		5,914,705	06-1999	Johnson et al.			
		5,944,151	08-1999	Jakobs et al.			
		5,956,016	09-1999	Kuenzner et al.			
		5,956,484	09-1999	Rosenberg et al.			
		5,959,613	09-1999	Rosenberg et al.			
		5,990,869	11-1999	Kubica et al.			
		6,028,593	02-2000	Rosenberg et al.			
		6,128,006	10-2000	Rosenberg et al.			
		6,154,201	11-2000	Levin et al.			
		6,219,034	04-2001	Elbing et al.			

Examiner Initials*	Cita	niner Cite Foreign Patent Document			Name of Patentee or	Pages, Columns, Lines,	
		No.1	Country Code ³	Number ⁴	Kind Code ⁵ (if known)	Publication Date MM-DD-YYYY	Applicant of Cited Document
		EP	0626634	A2			
		wo	95/02233				
		wo	95/20787				
		wo	95/20788				
		wo	95/32459				
		wo	96/16397				
		wo	95/22591				
		wo	96/42078				
		wo	97/12357				
		wo	97/19440		_	 .	
		wo	97/21160				
		EP	0349086	A1			

Examiner Signature	Date Considered	

EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

¹ Applicant's unique citation designation number (optional). ² Kind Codes of U.S. Patent Documents at www.uspto.gov or MPEP 901.04. ³ Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). ⁴ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁵ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible. ⁶ Applicant is to place a check mark here if English language Translation is attached.

Approved for use through 10/31/2002. OMB 0651-0031= U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

Substitute for form 1449A/PTO	Complete if Known		
	Application Number	10/687,830	
INFORMATION DISCLOSURE	Filing Date	October 20, 2003	
STATEMENT BY APPLICANT	First Named Inventor	Louis B. Rosenberg	
	Art Unit	2635	
(use as many sheets as necessary)	Examiner Name	Unassigned	
Sheet 6 of 11	Attorney Docket Number	IMMR-084/04US	

		OTHER PRIOR ART NON PATENT LITERATURE DOCUMENTS		
Examiner Initials *	Cite No. 1 Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), ti item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-in number(s), publisher, city and/or country where published.			
		"The Personal Digitizer™," Immersion Human Interface Corporation 1994.		
		Adachi, Yoshitaka et al., "Sensory Evaluation of Virtual Haptic Push-Buttons," Technical Research Center, Suzuki Motor Corporation, Nov. 1994.		
		Adelstein et al., "Design and Implementation of a Force Reflecting Manipulandum for Manual Control Research," DSC-vol. 42, Advances in Robotics, pp. 1-12, 1992.		
		Adelstein, "A Virtual Environment System for the Study of Human Arm Tremor," Ph.D. Dissertation, Dept. of Mechanical Engineering, MIT, Jun. 1989, archived Mar. 13, 1990.		
		Akamatsu, M. et al., "Multimodal Mouse: A Mouse-Type Device with Tactile and Force Display," Presence vol. 3, No. 1, Winter 1994, pp. 73-80.		
_		Atkinston, William D. et al., "Computing with Feeling,"Comput. & Graphics, vol. 2, No. 2-E, pp. 97-103.		
		Baigrie, "Electric Control LoadingA Low Cost, High Performance Alternative," Proceedings of Interservice/Industry Training Systems Conference, pp. 247-254, Nov. 6-8, 1990.		
_		Batter, James et al., "Grope-1: A computer Display to the Sense of Feel", pp. JA-4-188- TA-4-192.		
		Bejczy et al., "A Laboratory Breadboard System For Dual-Arm Teleoperation," SOAR '89 Workshop, JSC, Houston, TX, Jul. 25-27, 1989.		
		Bejczy et al., "Generalization of Bilateral Force-Reflecting Control of Manipulators," Proceedings of Fourth CISM-IFTOMM, Sep. 8-12, 1981.		
		Bejczy et al., "Kinesthetic Coupling Between Operator and Remote Manipulator," International Computer Technology Conference, The American Society of Mechanical Engineers, San Francisco, CA, Aug. 12-15, 1980.		
		Bejczy, "Sensors, Controls, and Man-Machine Interface for Advanced Teleoperation," Science, vol. 208, No. 4450, pp. 1327-1335, 1980.		
		Bejczy, et al., "Universal Computer Control System (UCCS) For Space Telerobots," CH2413-3/87/0000/0318501.00 1987 IEEE, 1987.		
		Brooks et al., "Hand Controllers for Teleoperation – A State-of-the-Art Technology Survey and Evaluation," JPL Publication 85-11, NASA-CR-175890, pp. 1-84, Mar. 1, 1985.		
		Brooks, F. et al., "Project GROPE-0 Haptic Displays for Scientific Visualization," Computer Graphics, vol. 24, No. 4, 1990, pp. 177-185.		

Examiner	Date Considered	
Signature	Considered	

EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

¹ Applicant's unique citation designation number (optional). 2 Applicant is to place a check mark here if English language Translation is attached.

Burden Hour Statement: This form is estimated to take 2.0 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231.

Approved for use through 10/31/2002. OMB 0651-0031= U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

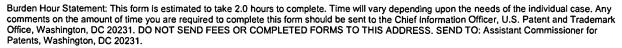
Substitute for form 1449A/PTO	Complete if Known		
	Application Number	10/687,830	
INFORMATION DISCLOSURE	Filing Date	October 20, 2003	
STATEMENT BY APPLICANT	First Named Inventor	Louis B. Rosenberg	
	Art Unit	2635	
(use as many sheets as necessary)	Examiner Name	Unassigned	
Sheet 7 of 11	Attorney Docket Number	IMMR-084/04US	

		OTHER PRIOR ART NON PATENT LITERATURE DOCUMENTS	
Examiner Initials *	Cite No.1	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	
		Burdea et al., "Distributed Virtual Force Feedback, Lecture Notes for Workshop on Force Display in Virtual Environments and its Application to Robotic Teleoperation," 1993 IEEE International Conference on Robotics and Automation, pp. 25-44, May 2, 1993.	
		Buttolo, Pietro, "Hard Disk Actuators for Mini Teloperation", Proceedings SPIE, Telemanipulator and Telepresence Technologies, Symposium, pp. 55-61, Boston, Oct. 31, 1994.	
		Caldwell et al., "Enhanced Tactile Feedback (Tele-Taction) Using a Multi-Functional Sensory System," 1050-4729/93, pp. 955-960, 1993.	
		Colgate, J. Edward et al., "Implementation of Stiff Virtual Walls in Force-Reflecting Interfaces," 1993, pp. 1-9.	
		Eberhardt et al., "OMARA Haptic display for speech perception by deaf and deaf-blind individuals," IEEE Virtual Reality Annual International Symposium, Seattle, WA, Sep. 18-22, 1993.	
		Ellis et al., "Design and Evaluation of a High-Performance Prototype Planar Haptic Interface", DSC-vol. 49, Advances in Robotics, Mechatronics, nd Haptic Interfaces ASME 1993.	
		Gotow et al., "Controlled Impedance Test Apparatus for Studying Human Interpretation of Kinesthetic Feedback," WA11-11:00, pp. 332-337.	
		Gotow, J.K. et al., "Perception of Merchemical Properties at the Man-Machine Interface", IEEE 1987, pp. 688-689.	
		Hannaford, B. et al., "Force Feedback Cursor Control," NASA Tech Brief, vol. 13, No. 11, Item #21, 1989, pp. i, 1-4.	
		Hannaford, Blake et al., "Performance Evaluation of a Six-Axis Generalized Force-Reflecting Telecoperator," IEEE May/Jun. 1991, vol. 21, No. 3, pp. 620-633.	
		Hasser, Christopher John, "Tactile Feedback for a Force-Reflecting Haptic Display," The School of Engineering, University of Dayton, Dec. 1995, pp. iii-xii & 1-96.	
		Hirota, K. et al., "Development of Surface Display," IEEE 0-7803-1363-1/93 1993, pp. 256-262.	
		Howe, "A Force-Reflecting Teleoperated Hand System for the Study of Tactile Sensing in Precision Manipulation," Proceedings of the 1992 IEEE International Conference on Robotics and Automation, Nice, France, May 1992.	
		Howe, Robert D., "Task Performance with a Dextrous Teleoperated Hand System, " Proceedings of SPIE, Nov. 1992, vol. 1833, pp. 1-9.*	

Examiner	Date	
Signature	Considered	

EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

¹ Applicant's unique citation designation number (optional). ² Applicant is to place a check mark here if English language Translation is attached.



Approved for use through 10/31/2002. OMB 0651-0031= U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

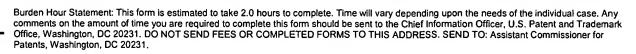
Substitute for form 1449A/PTO		Complete if Known
	Application Number	10/687,830
INFORMATION DISCLOSURE	Filing Date	October 20, 2003
STATEMENT BY APPLICANT	First Named Inventor	Louis B. Rosenberg
	Art Unit	2635
(use as many sheets as necessary)	Examiner Name	Unassigned
Sheet 8 of 11	Attorney Docket Number	IMMR-084/04US

		OTHER PRIOR ART NON PATENT LITERATURE DOCUMENTS	
Examiner Initials *	Cite No.1	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	
		IBM Technical Disclosure Bulletin, "Mouse Ball-Actuating Device with Force and Tactile Feedback," vol. 32, No. 9B, Feb. 1990.	
-		Iwata, H., "Artificial Reality with Force-feedback: Development of Desktop Virtual Space with Compact Master Manipulator," Computer Graphics, vol. 24, No. 4, Aug. 1990, pp. 165-170.	
		Iwata, Hiroo, "Pen-based Haptic Virtual Environment," 0-7803-1363-1/93 IEEE, pp. 287-292, 1993.	
		Jacobsen et al., "High Performance, Dextrous Telerobotic Manipulator with Force Reflection," Intervention/ROV '91 Conference & Exposition, Hollywood, Florida, May 21-23, 1991.	
		Jones et al., "A perceptual analysis of stiffness," ISSN 0014-4819 Springer International (Springer-Verlag); Experimental Brain Research, vol. 79, No. 1, pp. 150-156, 1990.	
		Kelley, A.J. et al., "Magic Mouse: Tactile and Kinesthetic Feedback in the Human-Computer Interface using an Electromagnetically Actuated Input/Output Device", Dept. of Electrical Eng., Univ. of British Columbia, 1993, pp. 1-27.	
		Kelley, A.J. et al., "On the Development of a Force-Feedback Mouse and its Integration into a Graphical User Interface,", Symp. on Haptic Interfaces for Virtual Environment and Teleoperator Systems, 1994.	
		Kilpatrick, Paul Jerome, "The Use of A Kinesthetic Supplement in an Interactive Graphics System", The University of North Carolina at Chapel Hill, Ph,D., 1976, Computer Science.	
		Kim, Won S. et al., "Graphics Displays for Operator Aid in Telemanipulation," IEEE 1991, pp. 1059-1067.	
		Kim, Won S. et al., A Teleoperation Training Simulator with Visual and Kinesthetic Force Virtual Reality.	
		Kontarinis et al., "Display of High-Frequency Tactile Information to Teleoperators," Telemanipulator Technology and Space Telerobotics, Won S. Kim, Editor, Proc. SPIE vol. 2057, pp. 40-50, Sep. 7-9, 1993.	
		Kotoku, Tetsuo et al., "Environment Modeling for the Interactive Display (EMID) Used in Telerobotic Systems," IEEE Nov. 3-5, 1991, pp. 99-1004.	
		Kotoku, Tetsuo, "A Predictive Display with Force Feedback and its Application to Remote Manipulation System with Transmission Time Display," IEEE 1992, Jul. 7-10, 1992, pp. 239-246.	
		Marcus, "Touch Feedback in Surgery," Proceedings of Virtual Reality and Medicine The Cutting Edge, Sep. 8-11, 1994.	

Examiner	Date	1
Signature	Considered	

EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

¹ Applicant's unique citation designation number (optional). ² Applicant is to place a check mark here if English language Translation is attached.



Approved for use through 10/31/2002. OMB 0651-0031= U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitut	Substitute for form 1449A/PTO				Complete if Known
				Application Number	10/687,830
INFC	RMATION	DIS	CLOSURE	Filing Date	October 20, 2003
STA	STATEMENT BY APPLICANT			First Named Inventor	Louis B. Rosenberg
				Art Unit	2635
(use as many sheets as necessary)				Examiner Name	Unassigned
Sheet	9	of	11	Attorney Docket Number	IMMR-084/04US

		OTHER PRIOR ART NON PATENT LITERATURE DOCUMENTS			
Examiner Initials *	Cite No. ¹	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.			
		McAffee et al., "Teleoperator Subsystem/Telerobot Demonstrator: Force Reflecting Hand Controller Equipment Manual," JPL1988, JPL D-5172.			
		Minsky, "Computational Haptics: The Sandpaper System for Synthesizing Texture for a Force-Feedback Display," Ph.D. Dissertation, MIT, Jun. 1995, archived Jul. 6, 1995.			
		Minsky, Margaret et al., "Feeling and Seeing: Issues in Force Display," ACM 1990, pp. 235-242.			
		Munch, S. et al., "Intelligent Control for Haptic Displays," Eurographics Association, vol. 15, No. 3, 1996, pp. C-217 to C-226.			
-		Noll, A. Michael, "Man-Machine Tactile Communication Dissertation," Polytechnic Institute of Brooklyn, Jun. 1971, pp. 1-88.			
Ouh-Young et al., "A Low-Cost Force Feedback Joystick and Its Use in PC Vide IEEE Transactions on Consumer Electronics, vol. 41, No. 3, Aug. 1995.					
	Ouh-Young, "Force Display in Molecular Docking," Doctoral Dissertation, University of North Carolina at Chapel Hill UMI Order No. 9034744, p. 1-369, 1990.				
	Ouh-young, Ming et al., "Force Display Performs Better than Visual Display in a Simple 6-D Docking Task," IEEE 1989, pp. 1462-1466.				
Patrick et al., "Design and Testing of A Non-reactive, Fingertip, Tactile Display Interaction with Remote Environments," Cooperative Intelligent Robtics in Spa deFigueiredo et al. Editor, Proc. SPIE vol. 1387, pp. 215-222, 1990.					
		Payette, J, et al., "Evaluation of a Force Feebdback (Haptic) Computer Pointing Device in Zero Gravity," DSC-vol. 58, Proc. of ASME Dynamics Systems and Control Div., ASME 1996, pp. 547-553.			
		Rabinowitz et al., "Multidimensional tactile displays: Indentification of vibratory intensity, frequency, and contractor area," Journal of the Acoustical Society of America, vol. 82, No. 4, Oct. 1987.			
		Ramstein, C. et al., "The Pantograph: A Large Workspace Haptic Device for a Multimodal Human-Computer Interaction," Computer-Human Interaction, CHI '94.			
		Ramstein, C., "Combining Haptic and Braille Technologies: Design Issues and Pilot Study," ASSETS '96, 2 nd Annual Conf. On Assistive Technology, 1996, pp. 37-44.			
		Rosenberg, "Using Force Feedback to Enhance Human Performance in Graphical User Interfaces", Apr. 1996, www.acm.org/sigch/ch;96.			
		Rosenberg, L.B., "Commercially Viable Force Feedback Controller for Individuals with Neuromotor Disabilities", AL/CF-TR 1997-0016, United States Air Force Armstrong Laboratory, May 1996.			
Examiner Signature		Date Considered			

EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

¹ Applicant's unique citation designation number (optional). ² Applicant is to place a check mark here if English language Translation is attached.

Approved for use through 10/31/2002. OMB 0651-0031= U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

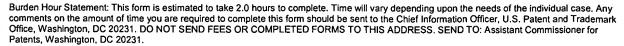
Substitute for form 1449A/PTO	Complete if Known	
	Application Number	10/687,830
INFORMATION DISCLOSURE	Filing Date	October 20, 2003
STATEMENT BY APPLICANT	First Named Inventor	Louis B. Rosenberg
	Art Unit	2635
(use as many sheets as necessary)	Examiner Name	Unassigned
Sheet 10 of 11	Attorney Docket Number	IMMR-084/04US

		OTHER PRIOR ART NON PATENT LITERATURE DOCUMENTS	
Examiner Initials *	Cite No.1	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	
		Rosenberg, Louis B. et al., "Perceptual Decomposition of Virtual Haptic Surfaces," IEEE, Oct. 1993.	
		Rosenberg, Louis B., "Perceptual Design of a Virtual Rigid Surface Contact," Center for Design Research Stanford University, Air Force Material Command, Apr. 1993, pp. 1-41.	
	:	Rosenberg, Louis B., "The Use of Virtual Fixtures as Perceptual Overlays to Enhance Operator Performance in Remote Environments," Air Force Material Command, Sep. 1992, pp. 1-42.	
		Rosenberg, Louis B., "The Use of Virtual Fixtures to Enhance Operator Performance in Time Delayed Teleoperation", Crew Systems Directorate, Biodynamics and Biocommunication Division, Wright Paterson AFB, OH 1993.	
		Rosenberg, Louis B., "Virtual fixtures as tools to enhance operator performance in telepresence environments", Stanford University, Center for Design Research, Stanford, CA 94305, SPIE Telemanipalator Technology, 1993.	
		Rosenberg, Louis B., "Virtual haptic overlays enhance performance in telepresence tasks", Stanford University, Center for Mechanical Engineering, Stanford, CA 94305.	
		Russo, "Controlling Dissipative Magnetic Particle Brakes in Force Reflective Devices," Advances in Robotics, pp. 63-70, ASME 1992.	
		Russo, "The Design and Implementation of a Three Degree of Freedom Force Output Joystick", <i>MIT Libraries Archives</i> , pp. 1-131, May 1990, archived Sep. 14, 1990.	
		Schmult, "Application Areas for a Force-Feedback Joystick", Department of Machine Perception Research AT&T Bell Laboratories, Holmdel, New Jersey, DSC-vol. 49, Advances in Robotics, mechatronics, and Haptic Interfaces ASME 1993.	
		Shimoga, "Finger Force and Touch Feedback Issues in Dexterous Telemanipulation," Proceedings of Fourth Annual Conference on Intelligent Robotic Systems for Space Exploration, Rensselaer Polytechnic Institute, Sep. 30-Oct. 1, 1992.	
		Slocum, Alexander, H., "Precision Machine Design", Massachusetts Institute of Technology. Prentice Hall, Englewood Cliffs, New Jersey, 07632.	
		Smith, Geoffrey, "Call It Palpable Progress," Business Week, Oct. 9, 1995, pp. 93, 96.	
		Snow et al., "Model-X Force-Reflecting-Hand-Controller," NT Control No. NPO-17851; JPL Case No. 7348, pp. 1-4 with 45 pages of attachments, Jun. 15, 1989.	
		Stanley et al., "Computer Simulation of Interacting Dynamic Mechanical Systems Using Distributed Memory Parallel Processors," DSC-vol. 42, Advances in Robotics, pp. 55-61, ASME 1992.	

Examiner	Date	
Signature	Considered	

EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

¹ Applicant's unique citation designation number (optional). ² Applicant is to place a check mark here if English language Translation is attached.



Approved for use through 10/31/2002. OMB 0651-0031**
U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

Substitute for form 1449A/PTO	Complete if Known	
	Application Number	10/687,830
INFORMATION DISCLOSURE	Filing Date	October 20, 2003
STATEMENT BY APPLICANT	First Named Inventor	Louis B. Rosenberg
	Art Unit	2635
(use as many sheets as necessary)	Examiner Name	Unassigned
Sheet 11 of 11	Attorney Docket Number	IMMR-084/04US

	OTHER PRIOR ART NON PATENT LITERATURE DOCUMENTS				
Examiner Initials *	Cite No.1	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.			
		Su, S. Augustine et al., "The Virtual Panel Architecture: A 3D Gesture Framework," IEEE 1993, pp. 387-393.			
		Tadros, "Control System Design for a Three Degree of Freedom Virtual Environment Simulator Using Motor/Brake Pair Actuators," MIT Archieve, pp. 1-88, Feb. 1990, archived Sep. 13, 1990.			
		Tan, Hong Z et al., "Manual Resolution of Compliance When Work and Force Cues are Minimized," ASME 1993, DSC-vol. 49, pp. 99-104.			
		Tan, Hong Z., "Human Factors for the Design of Force-Reflecting Haptic Interfaces", Tan, Srinivasan, Eberman, & Cheng, ASME WAM '94.			
		Tavkhelidze, D.S., "kinematic Analysis of Five-Link Spherical Mechanisms", Mechanism and Marching Theory, 1974, vol. 9, pp. 181-190, Pergamon Press, Printed in Great Britain.			
		Terry et al., "Tactile Feedback in a Computer Mouse," Proceedings of Fourteenth Annual Northeast Bioengineering Conference, University of New Hampshire, Mar. 10-11, 1988.			
		Wiker, Steven F. et al., "Development of Tactile Mice for Blind Access to Computers: Importance of Stimulation Locus, Object Size, and Vibrotactile Display Resolution," Proceedings of the Human Factors Society 35th Annual Meeting 1991, pp. 708-712.			
		Winey III, "Computer Simulated Visual and Tactile Feedback as an Aid to Manipulator and Vehicle Control", Massachuetts Institute of Technology, 1981.			
		Yokokohji, Yasuyoshi, "What You Can See is What You Can Feel – Development of a Visual/Haptic Interface to Virtual Environment", The Robotics Institutr, Carnegie Mellon University, 1996, IEEE, Proceeding of VRAIS'96.			

Examiner	Date	
Signature	Considered	

EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

¹ Applicant's unique citation designation number (optional). ² Applicant is to place a check mark here if English language Translation is attached.

